REMARKS

Initially, Applicant would like to thank the Examiner for granting a telephone interview held on October 8, 2002 and have made certain amendments pursuant to the Examiner's suggestion.

Applicant draws the Examiner's attention to the following facts. Through an inadvertent error, Applicant filed a preliminary amendment dated on April 18, 2002 based on PCT application PCT/EP98/06255, instead of an amended version filed on September 22, 1999 in response to an official communication dated June 2, 1999 during the PCT intentional phase. (In the international preliminary examination report, the patentability of the amended version was acknowledged and all rejections over Rompa and other references were withdrawn.) Applicant also filed the amended version at the time of the U.S. national phase entry.

Applicant requests that the Examiner reconsider the specification and the claims as now amended based on the amended version mentioned above.

Specification

Applicant files herewith a marked-up version and a clear version of the substitute specification based on the amended version mentioned above. Pursuant to the Examiner's suggestion, Applicant also submits a statement under 371 CFR 1.125(b).

Applicant has amended the abstract pursuant to MPEP § 608.01(b), as requested by the Examiner.

Objection to Claim 2

Applicant has amended Claim 2 by adding "an" between the words "as" and "element", as suggested by the Examiner.

Rejection of claims 22, 3, 5 and 8 under 35 USC § 112

The Examiner rejects claim 22 as containing subject matter which was not described in the specification. Applicant has canceled Claim 22 .

The Examiner rejects claim 3, contending that the limitation "said driven or freely rotating deflection sheaves is recited without sufficient antecedent basis." Applicant has amended claim 3 to remove the deficiency.

The Examiner rejects claim 5 under 35 USC § 112, second paragraph, contending that "like" renders the claim indefinite. Applicant has amended claim 5 to promote clarity.

The Examiner rejects claim 8 as being unclear as to what is claimed. Applicant respectfully disagrees. The language "said cable sheaves can be made rotate by a drive through a full floating axle or a hollow shaft" covers two alternative driving devices. Such language is permitted. See MPEP 2173.05(h), which states in part that "[A]alternative expressions using "or" are acceptable."

Rejection of claims 1, 4-6 and 11 under 35 USC § 102 (b) as being anticipated by Rompa

Claims 1, 4-6 and 1 are rejected as being anticipated by Rompa. Applicant respectfully disagrees.

Claim 1 covers an elevator with a structure of a self-supporting shaft scaffold. The self-supporting shaft scaffold includes vertical girders formed by segmental guide elements for the elevator cabin and segmental guide elements for a counterweight; and horizontal girders formed by module-shaped mounting frames connected to the segmental guide elements. The segmental guide elements provide both vertical guideways for the counterweight and the elevator cabin within the shaft scaffold, as well as support to the shaft scaffold. The self-supporting shaft scaffold is formed by connecting the segmental guide elements to the module-shaped mounting frames.

In Rompa, the support and the guide members are different elements for fulfilling different functions. While the support is particularly designed to bear the weight of the shaft sections, the guide members only function as guideways within the shaft. See column 2, line 39 through column 3, line 11 regarding the support, and column 3, line 54 through column 4, line 9 and lines 29-31 regarding the guide members. In contrast, in the elevator of claim 1, the segmental guide members not only bear the weight of the self-supporting shaft scaffold but also provide the guideways. See the proceeding paragraph. Further, in Rompa, the shaft sections do not include both the support and the guide members. See column 3, line 12 through line 53. In contrast, in the elevator of claim 1, the segmental guide elements, functioning both as support for the shaft and guiding members, are components of the self-supporting shaft scaffold. Also see the proceeding paragraph.

For the reasons set forth, claim 1 is not anticipated by Rompa. As claims 4-6 and 11 depend from claim 1, they are not anticipated by Rompa either.

Rejection of claims 7, 9 and 19-23 under 35 USC § 102 or § 103 over Rompa

The Examiner rejects claims 7, 9 and 19-23 as being anticipated by Rompa. As discussed above, claim 1 is not anticipated by Rompa. Claims 7, 9 and 19-23 depend from claim 1, and therefore are also not anticipated by Rompa.

The Examiner also rejects claims 7, 9 and 19-23 for obviousness over Rompa. According to the Examiner, claims 7, 9 and 19-23 all recite the type of drive that provides motive power to an elevator. The Examiner asserts that Rompa discloses a drive mounted at the top of the elevator shaft, and it would have been obvious to one of ordinary skill in the art that the drive taught by Rompa would be any possible drive.

As claims 7, 9 and 19-23 depend from claim 1, they each cover an elevator having a self-supporting shaft scaffold, as well as a certain type of drive. As discussed above, Rompa does not teach or suggest a self-supporting shaft scaffold. Even if the drive mechanism taught by Rompa, as well as any other possible equivalents, is combined with the elevator system of the invention, one of ordinary skill in the art could not have obtained the embodiments covered by claims 7, 9 and 19-23, each of which includes a self-supporting shaft scaffold.

Rejection of claims 2 and 3 under 35 USC § 103 over Rompa in view of Aulanko

The Examiner rejects claims 2 and 3 as being obvious over Rompa in view of Aulanko. The Examiner correctly points out that Aulanko teaches a drive mechanism for an elevator that is mounted within the shaft way and a bending flabby means is deflected by the driving mechanism. The Examiner proceeds to conclude that it would have been obvious to combine Rompa and Aulanko to allow a space saving at the top of a shaft way by eliminating the need for a mechanical room to house the drive mechanism, thereby making the system more economical to construct.

Applicant respectfully disagrees. Depending from claim 1, claims 2 and 3 both cover an elevator having the self-supporting shaft scaffold, as well as a deflection mechanism. Aulanko does not describe an elevator with a self-supporting shaft scaffold. Even if combining Aulanko

with Rompa, one of ordinary skill in the art could not have obtained the elevator of claims 2 and 3, which include a self-supporting shaft scaffold. Therefore, claims 2 and 3 are not rendered obvious from Rompa, Aulanko, or their combination.

Rejection of claims 10, 14 and 15 under 35 USC § 103 over Rompa in view of Laughlin Jr.

The Examiner rejects claims 10, 14 and 15 as being unpatentable over Rompa in view of Laughlin, Jr.

Applicant respectfully disagrees. Claims 10, 14 and 15 cover an elevator with a self-supporting shaft scaffold, as well as a drive is arranged in different positions in the elevator. Laughlin describes a means for applying power from a prime mover having one direction to intermittently move a load in opposite directions, and an apparatus in which the power is diverted to other uses when it is not required for moving a primary load. In other words, it teaches devices for applying power of intermittently moving a load, entirely unrelated to the claimed invention, and, like Rompa, is silent on the self-supporting shaft scaffold required by claims 10, 14 and 15.

Thus, one of ordinary skill in the art could not have obtained the elevator system as covered by claims 10, 14 and 15, even if combining Rompa with Laughlin Jr.

Rejections of claim 12 under 35 USC § 103 over Rompa in view of Ericson and Garrido

Claim 12 is rejected as being unpatentable over Rompa in view of Ericson and further in view of Garrido et al. Applicant respectfully disagrees. Claim 12 covers an elevator with a self-supporting shaft scaffold, as well as a brake disk. Ericson teaches a safety governor for use in an elevator system, more particularly a safety governor that is mounted on the elevator car. Like Rompa, it does not teach or suggest a self-support shaft scaffold. Garrido discloses a disc brake for use with the elevator system. Like Rompa and Ericson, it also does not teach or suggest a self-support shaft scaffold.

Since none of the three references teaches a self-support shaft scaffold, their combination, in any manner, does not suggest the elevator of claim 12, which includes a self-supporting shaft scaffold.

Rejections of claim 13 under 35 USC § 103 over Rompa in view of Anzai

Claim 13 is rejected as being unpatentable over Rompa in view of Anzai et al. Applicant respectfully disagrees. Claim 13 covers an elevator having a self-supporting shaft scaffold, as well as an emergency brake. Anzai provides improvements in a brake device for braking an electric motor for an elevator car through brake linings. Like Rompa, it does not teach or suggest a self-supporting shaft scaffold. Therefore, the combination of these two references does not render obvious claim 13, which requires a self-supporting shaft scaffold.

Rejection of claim 16 under 35 USC § 103 over Rompa in view of Muller

Claim 16 is rejected as being unpatentable over Rompa, and further in view of Muller et al. Applicant respectfully disagrees. Claim 16 covers an elevator with the self-supporting shaft scaffold, as well as a drive arranged thereon. Muller discloses a self-propelled elevator system and, in particular, a drive apparatus for a self-propelled elevator car. Like Rompa, it does not teach or suggest a self-support shaft scaffold. Thus, a combination of Muller and Rompa could not have produced the elevator of claim 16, which includes a self-supporting shaft scaffold.

Rejection of claim 17 under 35 USC § 103 over Rompa in view of Hakala

Claim 17 is rejected as being unpatentable over Rompa in view of Hakala et al. Applicant respectfully disagrees. Claim 17 covers an elevator with the self-supporting shaft scaffold, as well as a drive arranged on the counterweight. Hakala teaches a counterweight of a rope-suspended elevator moving along guide rails and an elevator drive machinery/motor placed in the counterweight. Like Rompa, it does not teach or suggest a self-support shaft scaffold as required by claim 17. Thus, one of ordinary skills in the art could not have obtained the elevator of claim 17 by combining Rompa and Hakala.

Rejection of claim 18 under 35 USC § 103 over Rompa in view of Pearson

Claim 18 is rejected as being unpatentable over Rompa in view of Pearson et al. Applicant respectfully disagrees. Claim 18 covers an elevator that includes the self-supporting shaft scaffold, as well as a flat belt. Pearson addresses improvements in traction elevators, especially a substitute for the usual ropes or cables that connect a car with a driving sheave, and

a novel arrangement for equalizing the strains upon the various parts of the elevator. Like Rompa, it does not teach or suggest a self-support shaft scaffold required by claim 18. Even if Person is combined with Rompa, what is covered by claim 18 could not have been obtained by the combination.

CONCLUSION

Applicant submits that the grounds for rejection asserted by the Examiner have been overcome, and that the claims, as now amended, define subject matter that is novel and nonobvious over the prior art. On this basis, it is respectfully submitted that the application is in condition for allowance. Early and favorable actions are respectfully requested.

Attached is a marked-up version of the changes that have been made to the claims and the abstract by the current amendment.

If for any reason this response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please contact Applicant's counsel.

Pursuant to 37 CFR §1.136, applicant hereby petitions that the period for response to the action dated June 21, 2002, be extended for one month to and including October 21, 2002. Enclosed is a check for $110 for the required fee. Please apply any other charges to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 10-21-02

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

Claims 1-23 have been amended as follows:

1. (Thrice Amended) An elevator comprising:

a drive moving an elevator cabin running in [an elevator shaft; and] a self-supporting shaft scaffold [;] and a counterweight in upward and downward directions in effective connection with [a cable or flat belt] one or more bending-flabby means guided over [cable] deflection sheaves[;],

wherein said self-supporting shaft scaffold is composed of

vertical girders formed by segmental guide elements for said elevator cabin and segmental guide elements for said counterweight; and

horizontal girders formed by module-shaped mounting frames connected to said segmental guide elements.

[wherein shaft is constructed of pre-assembled and vertical guide elements fixed thereto.]

2. (Thrice Amended) The elevator as defined in claim 1, wherein [the elevator has an elevator] said drive is arranged within [the elevator shaft] said self-supporting shaft scaffold and lifts and/or lowers the elevator cabin [as well as **a**] and said counterweight in said [elevator shaft] self-supporting shaft scaffold by [at least one] said bending-flabby means guided over an arrangement of deflection sheaves and said drive is integrated into the arrangement of deflection sheaves as an element deflecting said bending-flabby means.

3. (Thrice Amended) The elevator as defined in claim 1, wherein said [driven or freely rotating] deflection sheaves [required for lifting and lowering said elevator cabin and said counterweight] are mounted in said [pre-assembled] mounting frames for lifting and lowering said elevator cabin and said counterweight.

4. (Twice Amended) The elevator as defined in claim 1, wherein said [pre-assembled] mounting frames are made of squared sheets.

5. (Thrice Amended) The elevator as defined in claim 1, wherein said segmental guide elements are segmented into a plurality of segments, [said segments engaging at a working face like groove and tongue.] and said segments are engaged at a working face formed by a mechanism comprising a female member and a male member with a snug fit there between.

6. (Thrice Amended) The elevator as defined in claim 5, wherein said working face [of said segmental guide elements]is disposed in the area of said mounting frames, each respective mounting frame serving as a connecting element for the respective segments of said guide elements.

7. (Twice Amended) The elevator as defined in claim 1, wherein said drive consists of separately driven driving disks.

8. (Twice Amended) The elevator as defined in claim 1, wherein at least two of said [cable] deflection sheaves [can be] are made rotate by a drive by a full floating axle or hollow shaft.

9. (Twice Amended) The elevator as defined in claim 1, wherein said drive is formed with gear.

10. (Thrice Amended) The elevator as defined in claim 1, wherein said drive is arranged outside of said [elevator] self-supporting shaft scaffold formed by said mounting frames and said [vertical] segmental guide elements.

11. (Thrice Amended) The elevator as defined in claim 1, wherein said drive is arranged within said [elevator shaft] self-supporting shaft scaffold formed by said mounting frames [as well as] and said [vertical] segmental guide elements.

12. (Twice Amended) The elevator as defined in claim 1, further comprising a regulated cable brake on at least one of said mounting frames, the regulated cable brake running in mesh with a brake disk fixed to [the cable] said deflection sheaves arranged in said mounting frame.

13. (Twice Amended) The elevator as defined in claim 1, further comprising an emergency brake coming into engagement with the cable sheave in case of failure of the axis of said [cable] deflection sheave arranged in said mounting frame, on at least one of said mounting frames.

14. (Thrice Amended) The elevator as defined in claim 1, wherein said drive is arranged on the level of a floor or underground floor exit of said [elevator shaft] self-supporting shaft scaffold.

15. (Thrice Amended) The elevator as defined in claim 1, wherein said drive is arranged in a shaft pit in front of said [elevator shaft] self-supporting shaft scaffold.

16. (Twice Amended) The elevator as defined in claim 1, wherein said drive is arranged on said elevator cabin.

17. (Twice Amended) The elevator as defined in claim 1, wherein said drive is arranged on [a] said counterweight.

18. (Twice Amended) The elevator as defined in claim [2] 1, wherein [the] said bending-flabby means is a flat belt or a cable.

19. (Twice Amended) The elevator as defined in claim 1, wherein said drive is formed without gear.

20. (Twice Amended) The elevator as defined in claim 1, wherein said drive is formed as a ring engine.

21. (Twice Amended) The elevator as defined in claim 1, wherein said drive is formed as a disk engine.

22. (Cancelled) The elevator as defined in claim 1, wherein said drive is formed as a special engine.

23. (Twice Amended) The elevator as defined in claim 1, wherein said drive is formed as a flat engine. --

In the abstract:

Replace the abstract with the following version:

An elevator is provided which has a drive which in effective connection with a cable over deflection sheaves moves an elevator cabin running in [an elevator shaft] a self-supporting shaft scaffold, as well as a counterweight in upward and downward directions, wherein deflection sheaves, drive sheaves as well as guide elements are combined in pre-assembled mounting units which can be quickly and easily assembled in the place of use. [

] In addition, the elevator includes a drive which lifts and/or lowers an elevator cabin as well as a counterweight by at least one bending-flabby means guided over an arrangement of deflection sheaves, wherein the drive is incorporated into the arrangement of deflection sheaves as an element deflecting the bending-flabby means.

[CABLE/ROPE ELEVATOR] PRE-ASSEMBLED ELEVATOR SHAFT

The present invention pertains to cable elevators [as described in the preamble of patent claim 1].

Elevator [apparatuses] systems in which the elevator cabin is lifted or lowered [using] by cables are sufficiently known. A common way of action therein lies in arranging the required elements, like guide rails for the elevator cabin as well as deflection sheaves for the [ropes and the like,] cables etc. within an elevator shaft. This way of action is not only [is expressively] quite expensive [since] as a plurality of individual elements [has] have to be transferred to the respective mounting position, [and there] have to be [individually] arranged there individually and have to be connected [to] with the remaining elements of the elevator, but [simultaneously] also is essentially [unsuited] unsuitable for the subsequent [equipping of old houses] equipment of old buildings with elevator systems, as no elevator shafts [do exist] at all are existing in which the individual elements of the elevator system to be [installed] assembled could be arranged.

In order to be able to erect an elevator or to subsequently equip the housing with such one in spite of the lacking elevator shaft, the US patent US-A-3880258 provides that a self-supporting shaft scaffold is erected out of vertical and horizontal and vertical beams by plugging into one another individual modules consisting of vertical and horizontal beams step-by-step, i.e. one above the other, whereby a self-supporting shaft scaffold is created. On this self-supporting shaft scaffold the guide rails are fixed from the inside. These guide rails, however, only have a guide function. A load-reducing function is not taken over by the guide rails in this construction. Such erection of a self-supporting shaft scaffold thus is com-

paratively expensive in material and work, since after erection of the complete shaft an additional working cycle for fixation of the guide rails is required.

It, therefore, is the object of the present invention to create an elevator [apparatus] system which is independent from an elevator shaft provided for in a [building, which is simple in manufacturing as well as simple and economical in mounting and maintenance and which in particular] housing, which can be easily manufactured as well as being assembled economically and which in spite of the reduced material expense for the manufacture of the supporting structure also is flexible in particular in arrangeability of the drive or also the cable sheaves, for e.g. answering the most different [demands in] installation demands in modernization projects.

[This object is solved by the characterizing features of patent claim 1 elevator of the present invention, in particular, the preferred embodiments being described by the subclaims.]

An elevator [system] apparatus is provided for[,] in which the essential elements for operating the elevator, including the cable [guides, deflector] guide, deflection sheaves and drives are [combined] assembled in [modular-shaped] module-shaped mounting frames. In accordance with the present invention, these mounting [frames] units therein can be connected to form a self-supporting shaft scaffold which can be held on a house wall. The guide elements for the cabin and the guide elements for the counterweight form vertical beams of the shaft scaffold. By connecting them with the mounting frames forming the horizontal beams of the shaft scaffold, a self-supporting shaft scaffold is created with low material expense.

[Simultaneously, such a self-supporting shaft scaffold for the elevator can serve as support element for a protective covering by sheathing plates being

mounted thereon. The module-shaped mounting elements therein preferably are delivered to the mounting place as pre-assembled complete units and are combined there only. Nevertheless, the module-shaped mounting elements permit to mount the drive and the cable sheaves in particular in most different manner within the shaft cross-section surrounded by the module-shaped mounting elements as well as from outside on the module-shaped mounting elements.]

Simultaneously there are good possibilities for adaptation to the respective individual installment situation. Thus, e.g. in adaptation to the respective individual case it can be chosen which mounting frame is to be the one which accommodates the drive. In addition, there are manifold possibilities to individually define in which way and manner the respective elevator components, the drive and the cable sheaves are to be mounted on the mounting frame. Thus, there is the possibility of mounting within as well as outside of the shaft cross-section bordered by the module-shaped mounting elements. [

In accordance with the invention, said mounting units therein can be connected to form a self-supporting shaft scaffold which can be supported on a house wall.] Simultaneously, such a self-supporting shaft scaffold <u>for an elevator</u> can serve as support element for a [shaft cover for the elevator by mounting sheathing plates on it] <u>protective lining in that lining plates are mounted thereon</u>.

The module-shaped mounting elements therein preferably are delivered <u>as pre-assembled units</u> to the [mounting] place [as pre-assembled complete units] of <u>installation</u> and are [combined] <u>assembled</u> [there] only.

Further features and advantages of the present invention result from the following description of the attached drawing, wherein:

Fig. 1 is a top view onto an embodiment of the present invention with two disc engines located on bottom;

Fig. 2 is a side view of the embodiment shown in Fig. 1;

Fig. 3 is a top view onto another embodiment of the present invention with gear;

Fig. 4 is a top view onto another embodiment of the present invention with gear;

Fig. 5 is a top view onto another embodiment of the present invention;

Fig. 6 is a detailed view of a cable sheave in accordance with one of the embodiments of Figs. 1 to 5 with integrated disc brake;

Fig. 7 is a detailed side view of a cable sheave in accordance with one of the embodiments of Figs. 1 to 5 with integrated emergency brake; and

Fig. 8 is a top view onto the cable sheave of Fig. 7;

Fig. 9 is the schematic view of an embodiment of an elevator with a drive disposed in the elevator shaft;

Fig. 10 is a top view onto the embodiment of Fig. 9;

Figs. 11 and 12 are schematic side views of further embodiments;

Fig. 13 is a detailed view of a drive unit as used in the embodiments under Figs. 1 to 4, and

Figs. 14 to 17 are further embodiments of elevators with drive units located in the elevator shaft, of another kind than that shown in Figs. 1 to 13.

Fig. 1 shows a top view onto an embodiment of the present invention, in which an elevator cabin 1 provided with sliding doors 2, arranged and guided within a self-supporting shaft scaffold consisting of vertically extending segmented guide elements 3 for said cabin 1, also vertically extending segmented guide elements 4 for a counterweight 5 and as well as of module-shaped mounting frames 6 preferably manufactured of sheets bent in U-shape and open to bottom, by which said guide elements 3 and 4 can be connected, preferably screwed or welded together. Said mounting frames 6 therein can be located in arbitrary vertical position on said guide elements 3 and 4, on the intersecting points of the individual segments of said vertical guide elements in particular for connection thereof. At or in said module elements 6, driving disks 7 as well as cable sheaves 8 and 9 can be pre-assembled, which serve for driving and guiding the cable or flat band (not shown) required for lifting and lowering said elevator cabin 1. In the embodiment shown in Fig. 1 the two opposing driving disks 7 are made rotate using a full floating axle (not shown) or hollow shaft, which can be embodied with gear, without gear, as ring engine, special engine, flat engine or any other possible drive unit, wherein

said drive a/o. can be disposed e.g. vertically on or in said shaft wall or house wall in front of which said shaft scaffold is mounted.

Fig. 2 shows a partial side view of the embodiment to be taken from Fig. 1 of the present invention. Corresponding elements therein are provided with corresponding reference numbers. From Fig. 2 the connection in particular of the individual segments of the said vertical guide elements 3 and 4 by said module elements 6 can be taken, said segments of said guide elements 3 and 4 engaging at the working face like groove and tongue and being fixed to said mounting frame 6 using fixation means like screws 11 or the like. Therein Fig. 2 shows a so-called 1:1 embodiment. I.e. the loads (the cabin and the counterweight) to be lifted or lowered, respectively, each are fixed to one end of said flat belt or cable. Neither cabin nor the counterweight are suspended in block and pulley (no block and pulley effect is realized). A drive not shown which acts on said driving disks in accordance with the embodiment under Fig. 1 is disposed in the area of said lower mounting frame 6 together with said driving disks 7. I.e. here the embodiment "drive on bottom" is realized.

A drive (not shown) which in accordance with the embodiment under Fig. 1 acts onto said driving disks 7 can in modification of the embodiment shown in Figs. 1 and 2 be arranged in the most different positions of the shaft scaffold formed by said guide elements 3 and 4 and said mounting frame 6, i.e. on the lower

mounting frame 6 and on the upper mounting frame 6 as well as also on a further mounting frame possibly to be provided for as well as within or outside of the elevator shaft formed by said shaft scaffold.

Fig. 2a shows a partial side view of an embodiment which came into existence from a modification of Fig. 1. In this embodiment the 1:1 principle is realized. However, the drive 7`not shown, now is arranged on said upper mounting frame together with said driving disks, the principle "drive on top" is realized.

A further modification is shown in Fig. 2b. Here, the drive not shown as well as driving disks 7" again are disposed on said lower mounting frame (principle "drive on bottom"), but here the so-called 2:1 principle is realized. Both ends of the elevator cable or flat belt are fixed to the building. Said elevator cabin as well as said counterweight are suspended in block and pulley, i.e. the so-called block and pulley effect is made use of.

Fig. 2c shows a further modification. This embodiment as well works under the so-called 2:1 principle. In this embodiment, however, the drive not shown together with the relating driving disks 7" again is located in said upper mounting frame 6, i.e. the principle "drive on top" is realized.

In the embodiment shown in Fig. 3 the engine is located outside of the elevator shaft formed by said shaft scaffold of the kind as described with respect to Figs. 1 and 2, wherein, however, also arrangements of the drive 12 in the middle between said two driven driving disks 7 or in any other arbitrary position between said driving disks 7 are possible. The embodiment of Fig. 3 differs from the embodiment also with respect to the number as well as the arrangement of said cable sheaves 13 to 16 via which again the cable or flat belt required for lifting and lowering said cabin 1 as well as said counterweight 5 is guided.

Fig. 4 shows a further embodiment of the present invention. In difference to the embodiments under Fig. 3 said cable sheaves 16 are substituted for by a cable sheave 17 fixed to said counterweight 5. The drive again is effected using driving disks 7 which are driven by a shaft 18 connecting them, said drive being arranged in the middle between said driving disks 7 on said shaft 18. In the embodiment shown in Fig. 3 the drive 12 therein is seated in the area of a lower mounting frame 6. It also is conceivable to arrange said drive 12 in the area of said upper mounting unit 6 which together with said guide elements 3 and 4 as well as said upper mounting units 6 form said shaft scaffold for the elevator.

Fig. 5 in schematic view shows an embodiment in accordance with the invention, in which said elevator cabin 1 is arranged in rucksack-like manner in front of the means of up- and downward movement of said elevator cabin 1. All means

for moving said elevator cabin 1 as well as said counterweight 5 in upward and downward direction within said elevator shaft 1a therein are combined in a mounting unit 6 which can be flatly disposed in front of the rear wall of said elevator shaft, wherein in Fig. 5 only said driving disk 7 is shown schematically. Said driving disk 7 in the embodiment shown in Fig. 5 instead of a driving disk can also be a ring engine. However, a drive with gear also is conceivable, wherein drive and/or gear are located in the rear wall of said elevator shaft 1a and wherein the perforated plate principle is made use of.

Fig. 6 in schematic way shows a cable sheave 19 mounted in a mounting frame 6. On said mounting frame 6 in addition a preferably regulated cable brake 20 is arranged which runs in mesh with a brake disk 21 fixed to said cable sheave 19.

Fig. 7 in schematic way shows a cable sheave 22 rotatably arranged on a mounting frame 6 and preferably protruding upwardly through an opening 23 in the latter. Brake blocks 24 are disposed on both sides of said opening 23. In case of axial failure of said cable sheave 22 the latter is pulled in upward direction by the load of the elevator acting on said cables 25 into contact with said brake blocks 24 such that emergency braking of the elevator is effected. Fig. 8 shows a top view onto the arrangement under Fig. 7.

The further figures elucidate advantageous measurements for arranging the drive. Therein the drive can always be fixed outside of the "shaft cross-section" defined by said mounting frame, when the demand of optimum utilization of space requires fixation within the shaft cross-section defined by said mounting frame. Said mounting frames and said guide rails therefore will not be shown in the following, as the different manners of fixation are known to the expert.

Fig. 9 in a side view shows an elevator system with an elevator cabin 1h which is guided in lateral guides not shown, within said elevator shaft. Said elevator cabin 1h in accordance with the embodiment shown in Fig. 9 is lifted and lowered using a drive 3h which may be a so-called flat engine, a disk engine or a driving disk. The drive therein acts on a cable or flat belt 4h which, as shown, is anchored with both ends 4h1 and 4h2 at the ceiling of said elevator shaft (2:1 principle). Said cable or flat belt 4h therein runs from its first anchoring point 4h1 on the ceiling of said elevator shaft over a first sheave 5h located below said elevator cabin 1h to a second sheave 6h also located below said elevator cabin 1h and from there to a sheave 7h disposed below the ceiling of said elevator shaft. Said cable or flat belt 4h again is deflected by said sheave 7h and is guided within said elevator shaft in downward direction to said drive 3h and again is guided around the latter, wherein looping of said drive 3h of approximately three quarters of the circumference can be achieved by a correspondingly arranged further deflection sheave 8h. From said sheave 8h said cable or flat belt 4h again leads in upward direction to a deflection

sheave 9h also disposed below the ceiling of said elevator shaft and from there horizontally to a further deflection sheave 10h. From said deflection sheave 10h said cable or flat belt 4h is guided in downward direction to a deflection sheave 12h located at a counterweight 11h, wherefrom said cable or flat belt 4h again leads in upward direction to said second fixation point 4h2 on the ceiling of said elevator shaft.

Fig. 10 shows the same elements as Fig. 1, but in top view onto the arrangement.

In Fig. 11 an alternative embodiment of the course of said cables or flat belts for upward and downward movement of said elevator cabin 1k is shown (also 2:1 principle). Herein, the axes of rotation of said flat engine 3k as well as of said deflection sheave 8k being in direct efficiency contact with said flat engine 3k are arranged at right angle to the axis of rotation of the deflections sheaves 5k and 6k disposed on the bottom side of said elevator cabin as well as to the axis of rotation of said deflection sheave 12k on said counterweight 11k as well as to the axis of rotation of said deflection sheaves 13k and 14k in operation rotating in opposite directions. In the modification shown in Fig. 11 of the course of said cable or flat belt 4k for lifting and lowering said elevator cabin 1k one deflection sheave has been saved as compared to the embodiment under Fig. 9, as said deflection

sheaves 7k, 9k and 10k of Figs. 9 and 10 are substituted for by deflection sheaves 13k and 14k under Fig. 11.

Fig. 12 shows a further modification of the course of said cable or flat belt 4l for lifting and lowering said elevator cabin 1l (also 2:1 principle). Herein, the orientation of the axes of rotation of said flat engine 3l as well as of said deflection sheaves 5l, 6l, 8l, 12l, 13l and 14l is in the same direction. Said deflections sheaves as well as said flat engine therein preferably are located in the same plane, this permitting a flat and room-saving arrangement out of flat engine and counterweight outside of the area of said elevator cabin itself.

Fig. 13 in schematic view shows the possible arrangement of said flat engine 3m as well as the relating deflection sheave 8m, as shown in the embodiments in accordance with Figs. 9 to 12, in a possible positioning within a breaking-through of an elevator shaft wall 15m, wherein said breaking-through in the shown embodiment is provided with a bordering profiled frame 16m. The arrangement of flat engine 3m and deflection sheave 8m in said elevator shaft wall 15m can therein be provided for on the level of the underground floor or any other floor. Alternatively thereto, however, a positioning in the lateral door area on each floor or, however, in a shaft pit in front of said elevator shaft is conceivable. Said flat engine 3m therein simultaneously also serves as brake.

The embodiment of the preceding Figs. 9 to 13 having a cable or flat belt 4h-m for lifting and lowering said elevator cabin 1h-m, which is fixed on the ceiling of said elevator shaft with both ends permits an essentially arbitrary arrangement of the individual elements of said elevator with respect to one another, whereby good accessibility of the drive units and thus simple assembly as well as maintenance can be guaranteed.

Fig. 14 shows a further embodiment of the invention, in which a drive with two driving disks 17n and 18n separately or commonly driven by a connecting shaft is provided for. In contrast to the embodiment shown in Figs. 9 to 13, under the modifications under Figs. 14 to 16 of a further embodiment an elevator cabin is not lifted and lowered by a cable or flat belt fixed with both ends to the ceiling of said elevator shaft and which runs over deflection sheaves and a flat drive, but by two cables or flat belts 27n1 and 27n2 arranged in mirror-inverted manner with respect to one another. Therein, the ends respectively are fixed to a frame 19n on which an elevator cabin is to be suspended as well as to a counterweight 26n (thus the so-called 1:1 principle is realized). Between these two ends said cables or flat belts, respectively, 27n1 and 27n2 run over said deflection sheaves 21n and 23n or 20n and 22n, respectively to a driving disk 18n or 19n and from there over a deflection sheave 25n or 24n to said counterweight 26n. Said deflection sheaves 21n to 25n therein are fixed under the ceiling of an elevator shaft not shown, directly or via one or several frames, wherein the axes of rotation of said deflection

sheaves 24n and 25n over which said cables or flat belts 27n1 and 27n2 run to said counterweight 26n are arranged at right angle to the course of the axis of rotation of the remaining deflection sheaves 20n to 23n.

Fig. 15 essentially shows the same arrangement as can be seen from Fig. 14, however, said cables or flat belts 27p1 and 27p2 leading from said deflection sheaves 20p and 21p directly to said driving disks 17p and 18p, wherein said deflection sheaves 22n and 23n can be saved as can be seen from Fig. 14.

Fig. 16 finally shows a further modification of the embodiments under Figs. 14 and 15, wherein in addition to said deflection sheaves 20n to 25n to be seen from Fig. 14 (here 20q to 25q) further deflection sheaves 28q and 29q are provided for and said deflection sheaves 24q and 25q are disposed on the opposite side of said driving disks 17q and 18q seen with respect to the frame 19q, the axis of rotation of said deflection sheaves 24q and 25q corresponding to the orientation of the axes of rotation of said deflection sheaves 20q to 23q as well as 28q and 29q. Thus, the drive and/or said driving disks, respectively, 17q and 18q as well as said counterweight 26q can be arranged on the opposite sides of said frame 19q and/or said elevator cabin, respectively, suspended thereon.

Fig. 17 shows a further embodiment of the invention, a drive 31s being arranged on the bottom side of an elevator cabin 1 (guide not shown) guided in an

elevator shaft 33s, said drive acting on a cable or a flat belt 30s which is fixed on point 30s1 on the ceiling of said elevator shaft 33s as well as on point 30s2 on the bottom of said elevator shaft 33s. For achieving sufficient looping of said drive 31s preferably embodied as flat engine, an additional deflection sheave 32s is therein arranged below said elevator cabin 1.

Of course, also a combination of the individual features of the shown embodiments is possible.